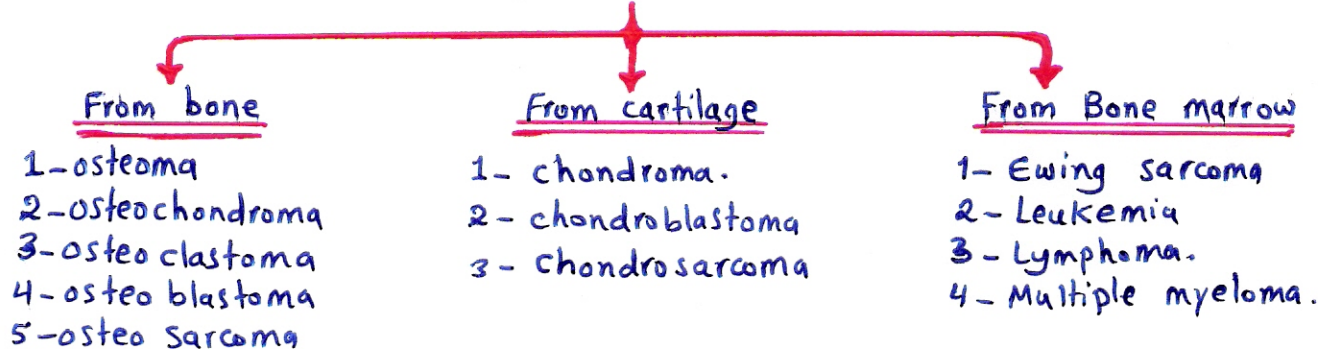
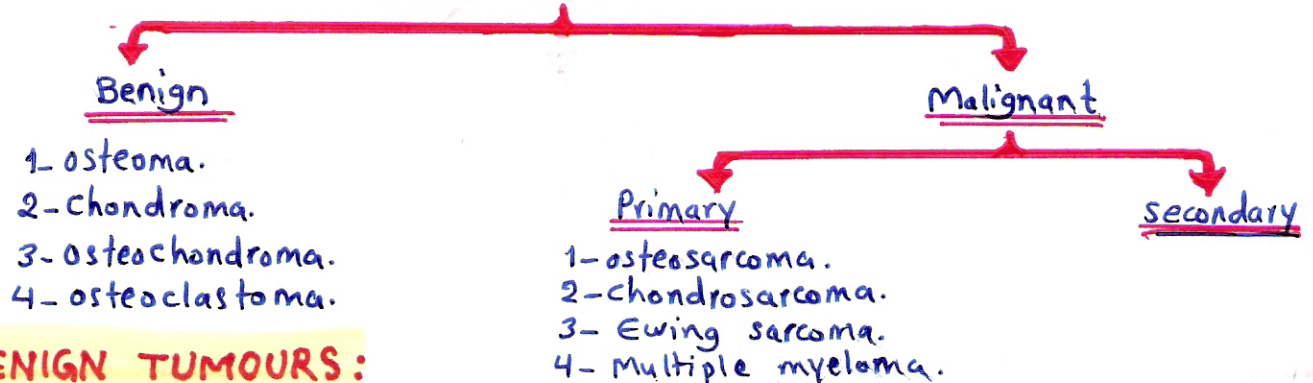


BONE TUMOURS

Classification



Other classification



(I) BENIGN TUMOURS:

Osteoma

*** Incidence:** rare benign tumour, affect young age (< 30 yr).

*** Pathology:** = site:- commonst is skull, next long bones (Femur, tibia)

= N/E:- hard, dome shaped swelling.

- very slowly growing & becomes stationary in adult life

= Composed of compact bone (ivory osteoma) or spongy bone (cancellous osteoma).



*** Clinical Picture:** Asymptomatic, except if complicated eg by pressure symptoms as Pressure on orbit, sinus, ear...etc

*** Investigation:** X-ray shows a sessile plaque of dense bone.

*** Treatment:** Excision & biopsy.

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NB:- Osteoid osteoma:-

- is a benign painful osteoma. (that may be self limiting)
- Pain mainly at night, and responds well to Aspirin that used as diagnostic test. [750% occur in Femur or tibia]
- X-ray shows a characteristic "Nidus" which is an osteolytic Point "Pathognomic", if not seen use CT scan.
- treated by surgical removal of Nidus that can be removed ~~by~~ under CT scan guid by Probe if very small.

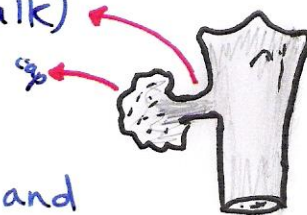
NA: Osteoblastoma:- "Giant osteoid osteoma"

- occurs in metaphysis of long bone., but common in ~~Osteo~~ spine & flat bone.
- It is Premalignant condition.

Osteo-chondroma

*** Incidence:** Osteochondroma (Exostosis) is the commonest benign tumour of bone

- * Pathology:** - It arises from the growing epiphyseal cartilage plate
- Arise from metaphysis of long bone especially around knee.
 - N/E:- smooth, Pedunculated swelling (stalk) that covered by cartilagenous cap.
 - Usually single, but in the condition of Diaphyseal aclasis it is multiple and rarely malignant change occurs in one of the tumours.
 - It increases in size ~~and~~ until bone growth stops (if ↑ in size after Puberty or becomes Painful indicate malignant change).



A.D and activity ceases activity at puberty

*** Clinical Picture:** ^{hard} swelling near the joint, Painless but may be complicated by affecting tendons or bursa → inflammation.

- * Complication:** ①- Compression of surrounding. ② fracture of stalk. ③- Malignancy (Sarcoma) in 5%.

*** Investigation:** X-ray shows Mushroom-like bony tumour.

*** Treatment:** Excision with it's base + biopsy especially if enlarge after Puberty, painful or compression

Chondroma

***Incidence:** It affects long bones of hand & foot (Phalanges) mainly.

***Pathology:** - N/E: Lobulated mass of cartilage, Premalignant.

- There are 2 types:-

① **Exochondroma:** tumour grows outwards from a bone.

② **Enchondroma:** grows centrally within a bone.

***Clinical Picture:** mild Painful swelling with Pathological fracture.

It may be single or multiple (**Dyschondroplasia** or **Ollier's disease**) which is a congenital condition where nests of cartilage cells displaced from epiphyseal plate into the metaphysis → multiple enchondromata → Limbs and hands & feet become short & deformed.

***Investigation:** X-ray shows mottled appearance (radio-lucent).

***Treatment:** Curettage of the tumour & bone graft for the defect.

Osteoclastoma

"Giant cell tumour"

***Incidence:** Common in young adult (15-40 yr), more in male.

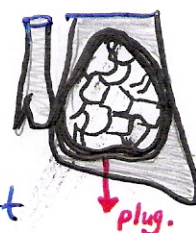
- It considered benign but behaves like malignant in that it recur after removal & causes Metastasis by blood

***Pathology:** - **Site:** ends of long bone [more in lower end of femur, upper end of tibia, lower end of radius & upper end of humerus].



- **N/E:** starts in metaphysis, destroying the bone substance with new bone formation → expansion with some bone trabeculae → Lobulated appearance.

- **C/S:** has a maroon-colour (dark brown) but may be white & it is separated from the shaft by a layer of bone called "Medullary plug"



- **Micro:** spindle cells with giant cells & multiple nuclei

the cells do not resemble osteoclast closely & don't behave like them so giant-cell tumour is preferred to osteoclastoma. cell of origin is unclear.

*** Clinical Picture :** - Painful swelling, gradually increasing in size. or patient may presented with a Pathological fracture.
 - O/E it is tender, hard swelling that later shows areas which yield under pressure (egg-shell crackling) & later becomes cystic.

*** Investigation:** X-ray shows expansion of epiphyseal end with a thin outer shell and a soap-bubble appearance.

*** Treatment:** depends on the site of tumour:-

- ①- Excision: it is possible in rib, fibula (upper end) & Ulna (lower end).
- ②- Curettage followed by packing with bone chips, this is done to femur & tibia [recurrence may occur].
- ③- Amputation may be necessary if there is extensive destruction, Pathological fracture or recurrent tumour.

NB: radiotherapy is contraindicated due to that it may bring malignant change [but it may bring permanent cure].

II. MALIGNANT TUMOURS:

(A) PRIMARY MALIGNANT TUMOURS:

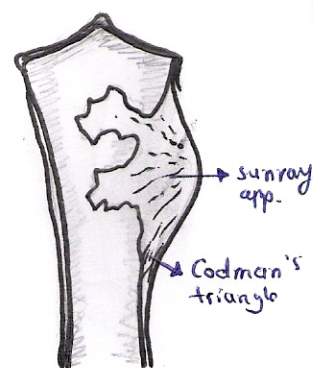
Osteoclastoma "osteogenic sarcoma"

*** Incidence :** It is tumour of childhood or adolescence (10-25 yrs) and more in Males. ; when occur late in life, it is often a complication of Paget's disease.

*** Pathology:** originate from Primitive bone forming cells.

- **Macroscopic picture:** - arise in metaphysis of long bone, in order of frequency: lower end of femur, upper end of tibia, lower end of radius & upper end of humerus.
- It is fleshy growth eroding the cortex extending into the marrow.
- At first it raises the Periosteum which causes

new bone deposited on raised subperiosteal vessels as transverse specules a picture called **Sunray appearance**, also is deposited on diaphyseal end of raised periosteum in form of a triangle called **Codman's triangle**.



- Later Periosteum invaded $\rightarrow$ extending into soft tissues $\rightarrow$ thin stretched skin $\rightarrow$ ulcer.

- **Microscopic:** Pleomorphic cells, with giant cells, $\uparrow$ mitosis, highly vascular.
- **spread:**
 - ① Local to surrounding tissue.
 - ② Blood :- early to lung and other bones.
 - ③ Lymph :- very rare.

* Clinical Picture:

- Pain and swelling that rapidly increasing in size (Wks to Months).
- O/E: Fusiform swelling in metaphyseal end with stretched skin and dilated veins, warm & tender, smooth surface, ill-defined edges, variable consistency (hard with soft areas)

* Investigation:

- X-ray $\rightarrow$ shows irregular destruction of metaphysis $\rightarrow$ burst cortex, subperiosteal deposition of bone (codman's Δ) and radiating specules within the tumour (sun-ray appearance).
- Look for metastasis (chest-x-ray).

* Treatment:

- Radiotherapy of tumour at first, followed by amputation for those who are free of metastases 6 months later.
- Nowadays Radiotherapy + early amputation followed by chemotherapy (as Vincristine, methotrexate & adriamycin).
- If there is Pulmonary metastasis $\rightarrow$ Palliative treatment

* Prognosis:

- Poor, average span 1-3 yrs, mortality rate 80% due to lung metastasis $\rightarrow$ respiratory failure.
- Improved nowadays with modern treatment

CHONDRO-SARCOMA :

* Incidence :-

- Commonest between 30-60 yrs, more in males.
- It is of two types:
 - Central type: commonly in femur, tibia or humerus.
 - Peripheral type: in flat bones e.g. hip & scapula.

* Pathology :-

- Microscopic:- highly cellular tumour with malignant characters.
- spread:- Local:- to surrounding.
 - Blood:- occurs late.
 - Lymphatic: very rare.

* Clinical Picture:

- Pain and swelling that is slowly growing. [x-ray → osteolytic lesion]

* Treatment :

- Amputation followed by chemotherapy. [prognosis better than osteosarcoma]

Ewing's tumour

- Ewing's tumour is a rare tumour, it is an endothelial ^(Bone marrow) sarcoma

* Incidence :

- Commonest between 5-15 yrs, more in males.

* Pathology:-

- Macroscopic: site:- in middle part of diaphysis of long bones ^{tibia, femur, humerus}
 - Ill-defined soft greyish-white mass in medulla, later bone deposited within the shaft in a form of multiple layers having an onion-peel appearance.
- Microscopic: round cells in sheets around blood vessels ^(like rosette)
- Spread: metastasises early through blood stream. to lung, bones

* Clinical Picture :

- Painful swelling in middle of shaft ± fever & malaise.
- skin is warm & stretch (DD osteomyelitis) [even ↑ ESR & leucocytosis]
- [x-ray] → onion-like

* Treatment :

- Radiotherapy ± chemotherapy followed by amputation. (Poor Prognosis)

Multiple Myeloma

- It is a malignant tumour of the red bone marrow, probably originated from plasma cells of bone marrow.

* **Incidence:** occurs between 40-60 yrs, more in males.

* **Pathology:** site mainly in sternum, ribs, vertebra, skull & femur.

• Macroscopic: rounded mass, greyish-red, well defined.

• Microscopic: Sheets of plasma cells.

• spread: may affect liver, spleen & occasionally lymph nodes.

* **Clinical Picture:** Pain especially in the back, later on pathological fracture or paraplegia, or other complication.

* **Investigation:** ① X-ray shows multiple circumscribed areas of bone destruction [no bone formation around.].

② Blood exam. :- Microcytic anemia, ↑ ESR, ↑ serum globulin & albumin globulin ratio is reversed.

③ Marrow biopsy → shows profuse plasma cells.

④ Urine exam. → Bence-Jones proteins in >50% cases.

* **Treatment:** radiotherapy + chemotherapy (cyclophosphamide) or (Endoxan + Vincristine + steroids) + repeated bd. transfusion

* **Prognosis:** fatal within few years.

* **Complication:** ① Pathological *

② Paraplegia.

③ hypercalcemia.

④ Metastatic calcifications.

⑤ Amyloidosis (10%).

⑥ severe anemia.

⑦ Renal failure, viscera^{involved}

⑧ ↑ infection (immuno-deficiency)

Fibrosarcoma.

- It is rare tumour arises within ends of femur & tibia.

* **Incidence:** occurs mainly in young adults.

* **Pathology:** Macro: Pale fleshy mass, Micro: large fibroblasts.

* **Clinical Picture:** Painful swelling, X-ray: osteolytic lesion.

* **Treatment:** amputation [Good Prognosis if well differentiated tumours].

B SECONDARY TUMOURS OF BONE :

- Secondary (metastatic) tumours are ~~more~~ much more common than Primary tumours & generally occur in later life
- Metastasis usually from [thyroid, lung, breast, kidney & Prostate] also from malignant melanoma.
- Types are osteolytic or osteosclerotic.

① Osteolytic secondaries :-

- It is the commonest type, localized spherical area of destruction which can cause pathological fracture
- Commonest site is lumbar vertebra (especially from Prostate) and also thoracic (mainly from breast)
- Can cause collapse of vertebra & spinal cord compression, paraplegia with back pain

② Osteosclerotic type :

- new bone formation $\rightarrow$ $\uparrow$ bone density.
- Only Prostate tumour causes osteosclerotic lesion.

* Clinical Picture of secondary T.

- Severe pain $\pm$ symptoms of complications (path. $\times$, paraplegia, etc).

* Investigation.:

- X-ray (AP-lateral) shows osteolytic or osteosclerotic.
- Alkaline phosphatase $\uparrow$ [especially prostatic tumour].
- Radio-isotope scanning (bone survey) (skeletal survey) by Tc^{99} may show hot spots (secondaries).

* Management : usually palliative radiotherapy & manage primary tumours

[NB: the best palliative ~~ttt~~ for pain is radiotherapy $\rightarrow$ $\downarrow$ size of tumour $\rightarrow$ $\downarrow$ perosteal stretch $\rightarrow$ $\downarrow$ pain.]